SECTOR ASSIGNMENT DOCUMENT

FOR THE

HIGH-ENERGY ENGINEERING X-RAY (HEX) BEAMLINE

AT SECTOR 27-ID AT NSLS-II

OCTOBER 13, 2017

NSLSII-27ID-PLN-002

REVISION 1

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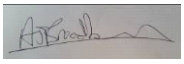
FOR THE

HEX BEAMLINE AT SECTOR 27-ID AT NSLS-II

OCTOBER 13, 2017

PREPARED BY:

2/16/2018

X 

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(Approval on behalf of Light Source Safety and Operations Council [LSSOC])

By approving this plan I acknowledge the requirements set forth herein and agree with its implementation.

REVISION HISTORY

REVISION	DESCRIPTION	LIST OF REVIEWERS	DATE
1	First Issue.	See page ii	JUL2011

1 SUMMARY

This document summarizes and formalizes the assignment of space for the HEX beamline in NSLS-II Sector 27-ID. Only activities and infrastructure described and approved below are permitted. When approved, this provides authorization for the beamline to use resources, and to occupy and use space, as indicated. No installation of enclosures, furniture, control or computing areas, or sample preparation spaces are permitted unless described below and approved. The use of spaces proposed here shall comply with all NSLS-II, SBMS and other BNL requirements.

General Information	
Sector Information	27-ID
Name of Beamline	High energy Engineering X-ray (HEX)
Floor space amendment at 27-ID defined in current version of PD-LAY-1002	No changes requested to standard sector walkway layout. See attached floor diagram.
Floor area usage other than for office type equipment (seating/desk area)	None. Satellite building may house the following; • Beamline operator consoles. • Sample preparation benches. • Mechanical technician workbench. • Gas bottle storage and cabinets. • Space may be used for experimental equipment storage. See Attachment A for floor diagram
Number of Hutches	7
27-ID-A: FOE	Contains hard x-ray optics including Laue monochromators, vertical focusing mirror, as well as filters, diagnostics and safety components. White beam and primary bremsstrahlung will not be stopped in the FOE. Initial project scope assumes full design, but only partial fit-out of this hutch.
27-ID-B: End Station	Future expansion to be used for ADXD (PDF) studies. Designed to be operated independently using branchline shutter and side diffracting Laue monochromator from the SCW inboard beamlet (crosses over the other two branches). PPS and utilities will not be implemented in the initial scope. Approved experiment instruments: Experiment instrumentation undefined; ESR not approved.
27-ID-C: Optics Station	Secondary optics station on the HEX white beam lines. Primary components include masks and collimators.
27-ID-D: End Station	Future experimental hutch designed for EDXD experiments (white beam from the outboard beamlet of the SCW). PPS and utilities will not be implemented in the initial scope. Approved experiment instruments: Experiment instrumentation undefined; ESR not approved.

27-ID-E: End Station	Future experimental hutch designed for ADXD and EDXD experiments (white and monochromatic beam). This will most likely be a workhorse station fitted with a robot. PPS and utilities will not be implemented in the initial scope. The downstream end of the hutch will be fitted with a shutter to prevent beam propagation to the satellite building stations. Approved experiment instruments: Experiment instrumentation undefined; ESR not approved.
27-ID-F: Optics Station (in satellite building)	Optics hutch designed to support the requirements of the G-station. Fitted with utilities and PPS within initial beamline scope.
27-ID-G: End Station (in satellite building)	A large and flexible experimental hutch designed to support the requirements of ADXD and EDXD experiments (white and monochromatic beam). This station will cater for a wide range of possible experimental setups, some with long set-up times or requiring large equipment with complex exhaust or utility requirements. Fitted with utilities and PPS within the initial scope. Once the E-station is fitted out, either endstation E or G may be operated at any one time. Approved experiment instrumentation: Defined and will be approved within the Instrument Readiness Review (subject to scope contingency not being required).
Source and Front End Information	
Source Device	Superconducting Wiggler (SCW70)
Front End	As defined in: NSLSII-27ID-RSI-001.
Egress Information	
Egress from Hutch Roof	FOE egress onto SR tunnel roof. Hutches B/C/D/E egress via stairs to experimental floor. Hutches F/G will not have roof access (except under permit). The requirement for 50’ common path of travel route, and the requirement for 150’ (TBC) maximum distance to an exit, will be met.
Floor Egress	Standard: 4’ wide duck-under route unrestricted and unchanged from standard layout (between A and B hutches)
Special radiation Shielding Requirements	High energies in all hutches will require special attention, possibly 5 bounce rule for doors and labyrinths (TBC). Satellite building hutches will be constructed from concrete (thickness TBC, probably ~1m).

Utilities	
Electrical Power	Electrical power distribution includes 120V and 208V (single phase) and 208V (three phase) with 100A service for experimental floor, and 100A service for satellite building (TBC that this is adequate). The utilities distribution includes sub-panel distribution boards with appropriate and properly labeled circuit breakers at each enclosure or experiment area, cable trays, all the electrical outlets in the enclosures and along the beamline and wiring to light fixtures, fans, hoists, etc., inside the enclosures. All distribution meets NEC and BNL SBMS requirements.
DI water	De-ionized (process) water distribution not to exceed 15 gpm (57 l/min) (standard maximum) at 85F+0.2F (29.5C+0.1C) and 1 MPa (150 psi) max design pressure at 38 C (100 F). Typical working pressure for beamline components needing cooling due to photon heat loads ~0.7 MPa (~100 psi).
Chilled water	Chilled water at 12C (53F) not to exceed 24 l/min (6 gpm) distributed to all equipment racks and some (future) items of end station equipment such as furnaces, compressors, etc. The velocity in the pipe is not to exceed 2 m/sec (6.5 ft/sec). Typical working pressure 0.7 MPa (100 psi). The minimum differential pressure shall be 0.17 MPa (25 psi).
Compressed air	Facility compressed gas (compressed air) is provided at 0.5 MPa (75 psi) nominal with maximum pressure of 0.85 MPa (125 psi) and 5 l/sec (10 cfm) flow rate for 5 seconds with 30 second recuperation. Compressed air for the satellite building shall be taken from the high capacity header adjacent to the outer columns.
Compressed Nitrogen gas	Compressed nitrogen gas flow rate up to 10 l/sec (20 cfm) at STP, with a nominal working pressure of 0.2 MPa (30 psi) and a maximum pressure of 0.85 MPa (125 psi).
LN2	Liquid nitrogen distribution from the local interface point on the SR tunnel roof with valved tap-off point for use with pumped liquid nitrogen cooled heat exchangers (cryocoolers) and experimental hutches B/D/E/G. Peak flow rate of not to exceed 150 l/hour (40 gals/hr) with a supply pressure of 0.2 –0.3 MPa (30–45 psi). All stations containing LN2 pipework will be fitted with approved oxygen depletion sensors and alarms.
Special gases	Special gases (toxic / flammable) will be required and subject to safety review before installation.
Gas extraction system	Gas extraction from hutches B/C/D/E will occur through the phoenix valve above column 12. Gas extraction from hutches F/G (satellite building) will occur through the phoenix valve above column 14 (unless this is used for PDF beamline, in which case this will connect to the valve above column 12).
Smoke detectors	To be fitted as required (hutches and racks).

Vibration / thermal / noise impacts on adjacent beamlines	None. No compressors, rotary pumps (except temporary use of roughing carts and leak detectors). Impact due to cryocooler (pump has speed control) is assumed to be negligible. Cryogenic sample environments do not use compressors (piped LN2, or LHe from dewars). Any additional equipment such as a large volume press, will require hydraulics, vibration study to be performed and approved prior to construction.
Experiment instruments & safety envelope	Safety envelope for 27-ID includes components installed in the FOE and 27-ID-G, as well as the connecting sections of white beam transport pipe, subject to Instrument Readiness Review. Experimental activities controlled through hazard assessment and authorized through Experiment Safety Review (ESR) approval process together with Safety Approval Form (SAF). Additional instrumentation in any hutch will require further analysis and review.

If you have any questions or feedback regarding this document, please click this link.

Attachment A: HEX Beamline Floor Layout Diagram